

WHAT IS CLAIMED IS:

1. A universal battery charger for charging batteries with different number of cells connected in series, comprising:

5           a power supply circuit that produces a predetermined number of voltages different in level for applying selected one of the predetermined number of voltages to a battery, the predetermined number of voltages including a highest voltage and a lowest voltage;

10           a switch that is connected between the power supply circuit and the battery and is turned ON to allow the selected one of the predetermined number of voltages to the battery and OFF to interrupt the power supply circuit from the battery; and

15           a control device that controls the power supply circuit to produce a voltage to be applied to the battery and also controls the switch so that a rush current does not flow in the battery when the voltage to be applied to the battery is switched from one level to another level.

20           2. The universal battery charger according to claim 1, further comprising a battery voltage detecting circuit that detects a voltage across the battery, wherein the control device controls the power supply circuit to produce a voltage equal to or close to the voltage detected by the  
25   battery voltage detecting circuit and further controls the

switch to turn on.

3. The universal battery charger according to claim 2,  
wherein the control device controls the switch to turn on  
after expiration of a predetermined period of time from a  
5 time when the voltage equal to or close to the voltage  
detected by the battery voltage detecting circuit is  
produced by the power supply circuit.

4. The universal battery charger according to claim 3,  
wherein the voltage close to the voltage detected by the  
10 battery voltage detecting circuit is a voltage above and  
closest to the voltage detected by the battery voltage  
detecting circuit among the predetermined number of voltages.

5. The universal battery charger according to claim 3,  
wherein the control device further controls the power supply  
15 circuit to produce the highest voltage after the switch is  
turned on.

6. The universal battery charger according to claim 2,  
further comprising a battery connection detecting device  
that detects that the battery is connected for being charged,  
20 wherein when the battery connection detecting device detects  
that the battery is connected, the battery voltage detecting  
circuit detects a voltage across the battery and the control  
device controls the power supply circuit to produce the  
voltage equal to or close to the voltage detected by the  
25 battery voltage detecting circuit, and thereafter controls

the switch to turn on.

7. The universal battery charger according to claim 6,  
wherein when the battery connection detecting device detects  
that the battery is not connected, the control device  
5 controls the power supply circuit to produce the lowest  
voltage.

8. The universal battery charger according to claim 2,  
wherein when a difference between the voltage detected by  
the battery voltage detecting circuit and the voltage  
10 produced by the power supply circuit falls within a  
predetermined range, the control device controls the switch  
to turn on.

9. The universal battery charger according to claim 8,  
wherein the voltage close to the voltage detected by the  
15 battery voltage detecting circuit is a voltage above and  
closest to the voltage detected by the battery voltage  
detecting circuit among the predetermined number of voltages.

10. The universal battery charger according to claim 9,  
wherein the control device further controls the power supply  
20 circuit to produce the highest voltage after the switch is  
turned on.